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An Exposure of Commercial Banks in the Terms of an Impact of Government Bondholding with the Context of Its Risks and Implications

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ABSTRACT

The European government bonds are considered a safe investment among the asset managers and investors. For instance, commercial banks as portfolio holders use them to achieve additional yields, and to store liquidity in them or to refinance via them, when government bonds serve as a collateral in the refinancing operations. The financial and debt crisis changed the view of the European government bonds as the safest form of investment. Considering this economic development, some advanced European countries failed to meet their liabilities resulting from issued bonds towards their holders. In this analysis, a focus is laid on the contemporary issues related to government bondholdings by commercial banks in view of the current financial crisis conditions. Based on the European Central Bank data, we analyse the relationship between the credit rating of the bond and the ten-year interest rates of government bonds by means of the panel regression on the bondholding of commercial banks in the period from 2010 to 2014. Our regression suggests that there is a statistically significant correlation between these independent variables and bondholding. A preferential treatment of the government bonds as the risk-free assets might lead to an overexposure of the commercial banks to the domestic bonds. As an implication, we summaries the proposals for treating overexposure of commercial banks to national debts in the recent time.

INTRODUCTION

The government bonds of the European Union countries are known as a safe instrument for long-term investment. A large investment of the banks, insurance companies and other financial institutions are comprised of these government bonds (Clark, 1938; Johnson et al., 2000; Kaźmierczyk and Aptacy 2016; Illmeyer et al., 2017). These bonds are mainly used to reduce portfolio risk and to ensure a sustainable return once the maturity of the bonds is reached. So that the banks and other institutions can get a predictable cash-flow given by coupons and face value of the bonds.

However, the financial crisis has changed the opinion and reduced the confidence level of the investors regarding the European sovereign bonds as the most secure asset (Campello et al., 2010; Mendoza, 2010; Vychytilova, 2015; Liu, 2016; Mací and Valentova Hovorkova, 2017; Mihoková et al., 2017; Rahman et al. 2018). The main reason for this changed opinion is due to the failure of some euro area countries to meet their liabilities and that led to decreased credit quality of bonds as well as contributed to the uncertainty of the financial markets. The goal of this paper is to analyses an evolution and an impact of government bondholding by commercial banks caused by the selected factors which were affected by the debt crisis – for instance, credit rating of the sovereign bonds and the interest rates of bonds. A part of this paper is also devoted to possible impacts and implications of the two proposed alternatives aimed at a decrease of over-exposure of the commercial banks towards the national debts.

The recent debt and financial crisis have changed the assessment of the global investors about the sovereign bonds as the safest form of investment thanks to an increasing debt burden of some countries which failed in meeting their liabilities towards their creditors (Ivashina and Scharfstein, 2010). The financial crisis and global economic recession have caused a sharp deterioration in public finances throughout the developed and developing economies (Panetta et. al., 2011; Hager, 2014; Pietrasienski and Slusarczyk, 2015; Lajtkepova, 2016; Kittova and Steinhauser, 2018). The government fiscal deficits have negatively affected reflecting the effects of the automatic stabilisers, the discretionary stimulus measures to reduce the severity of the downturn and support to the financial sector (Masood et al., 2017). Between the end of 2007 to the end of 2010, the average budget deficits in the developed countries increased from 1 % to 8 % of the gross domestic product and the gross government debt rose from a level of 73 % to a level of 97 % of the gross domestic product. In the emerging economies, the government debt levels possess a lowering trend. This deterioration of the public deficits and the sovereign creditworthiness has also impacted a volume of bondholding kept by the financial institutions (Sinicakova and Gavurova, 2017).

The main aim of the paper is to reveal a relation between the possession of the government bonds and the risks influenced by the financial and debt crisis. The comprehensive literature review offers a suitable introduction to the executed analysis. The panel regression with the random effects model reveals a credit rating influence on the government bondholding.

1. LITERATURE REVIEW

The issue of the government bonds especially from a risk point of view is dealt with in many scientific papers (Reinhart and Rogoff, 2011; Karanikolos et al., 2013; Vukovic et al., 2017). The risk premium is of specific importance, which is quantified by several types of econometric models in general (Androniceanu, 2017; Balcerzak et al., 2017; Kliestik et al., 2018). This procedure was determined by K. Bernoth, J. von Hagen and L. Schuknech (2012) who consider the bond market in the euro area. By using capital asset pricing model, the other authors like P. Abad, H. Helena Chuliá and M. Gómez-Puig (2010) quantify a systemic risk on the government bond market of the selected euro area countries in a relation to the world risks. As stated by J. Yawitz, G. Hempel and W. Marshall (1976), the aim of each asset manager is to create an optimal portfolio, and where they also include the sovereign bonds to diversify between risky and non-risky asset.

A specific issue of the Greek government bonds as a part of the bond portfolio of the financial institutions is mentioned by D. Chionis, I. Pragidis and P. Schizas (2014), who analyse mainly an influence of the macroeconomic indicators on the ten-year government bond yields. They primarily focus on the indicators such as government debt, deficit, gross domestic product growth, inflation, unemployment, which all effect the long-term bond yields.

Much attention is paid to this issue also in the studies of the other authors in the working papers of the European Central Bank, the International Monetary Fund and the other institutions (Ohanyan and Androniceanu, 2017). A recent study by M. Gómez-Puig, S. Sosvilla-Rivero and M. Sing (2015) reported that the outbreak of the sovereign debt crisis in late months of 2009 when the newly elected Greek government announced that the country's budget deficit was much larger than it had been previously reported, the authors argue that the cause of this deficit is not only due to their country specific issue rather it is also connected to the economic imbalances of other euro area countries. It is necessary to mention that the interconnection between private and public debt and thus, between the bank crisis and the sovereign debt crisis is quite noticeable (Sinicakova et al. 2017).

However, it is not very clear to the financial arena whether it was the private debt that ultimately bankrupted the sovereign bonds or whether, conversely, it was the excessive public debt that undermined the banking sector is an arguable issue. The main causes of the debt crisis in European countries are still in an ongoing research issue. For example, in some countries, the public sector was excessively affected by the costs of cleaning up the financial system and was forced to seek bailouts as for instance in Ireland and Spain, whilst in the other cases, the main source of vulnerability was concentrated in the public sector balance sheet itself as it happened in Greece, Portugal and Italy. Similarly, with the increase of global financial uncertainty, the concern about exposure of the euro area banks to bad assets rose. The banks' exposure to the bonds of their own governments became a crucial question, especially due to the absence of any regulatory discrimination between the bonds in Euro countries. The absence of regularity discrimination allowed the bank not to hold any capital buffer against their euro denominated sovereign bonds portfolio. The European Banking Authority carried out a stress test and showed that a tendency of the local banks to hold the home country sovereign bonds significantly. The test reveals that the tendency of holding a large portion of sovereign bonds are inducing the transmission of these risks from the sovereign bond sector to the whole financial.

According to J. Andritzky (2012), the recent crisis has changed the investors demand for the government bonds regardless of increased issuance volumes. Prior to the crisis, a large portion of the new government securities was taken up by the non-resident investors, who often undercut the bids from the domestic accounts. However, during financial crisis, the investors of the government securities has shifted back towards the domestic holders. That means, a large portion of the bond holds are mainly from the local economies and hence reduced number of foreign investors. Due to quantitative easing facility of various governments around the world, the central banks have become the important players in the government bond market. It is also noticeable that the commercial banks started to hold more government bonds – partly to obtain collateral – regardless a decrease in their overall balance sheet.

The existing literature on government bond holding and the financial crisis has been highlighted in various papers. For instance, studies by J. Huang and Y. Wang (2014) and N. Gennaioli, A. Martin and S. Rossi (2015) carried out their research in more than 20.000 banks in 191 countries considering the 20 sovereign defaults over the period from 1998 to 2012. The results from their study show that on an average 9 % of the bank's assets are invested in government bonds, and more than 75 % of the holding are the domestic bonds. The result also finds that during the sovereign defaults, exposure to the government bonds was increased considerably. As it will be stated later in the analytical part, this finding is consistent with the output coming from our the analysed model. As per the above studies, there is a plenty of reasons why banks increase their sovereign bondholding during default – for instance their risk absorbing ability, regulation in the financial market and financial repression

issues. The authors concluded that there are the two main hypotheses for the determinants of bank bondholding, the liquidity view and risk- taking view. The liquidity view suggests that the banks buy bonds as their steady business activity because they can be stored as buffer to liquidity and can be used as collateral during interbank borrowing. The risk-taking theory suggests that the banks maintain or even increases their bondholding quite steadily when they are risky. The theory suggests that banks pursue this strategy, because of the bailout guarantees. However, the risk-taking view has been on the spot light for the recent sovereign debt crisis, where the large increase in bondholding has been attributed to the banks' search for yield and to moral support. This also might include liquidity extensions to the banks and the direct purchases of the government bonds or the conditional commitments to purchase them by the central banks. The literature suggests that governments are willing to repay the debts when the local commercial banks are holding the bonds.

The existing literature also found that commercial buy the government bonds because the bonds are not entitled for risk calculation of the bank's capital requirement as the sovereign bonds are considered as risk – free asset. V. Acharya and s. Steffen (2013), argue that the local banks likely to hold poor quality government bonds which allows them to evade the capital regulation of the central bank and also to gain high returns without impacting the risk of diversification. Empirical research by C. Bonner (2014), suggests that the preferential treatment about the capital regulation and liquidity benefit of the sovereign bonds increases the banks' demand for the government bonds regardless of their idiosyncratic risk tolerance by transaction-level data. Booner, also highlighted the rationale behind the positive treatment in financial regulation is a view that government bonds are risk-free assets and hence considering them as a reliable source of bank liquidity and collateral for external loans. He further stated that this favorable treatment of sovereign bonds by the central banks leads to a longer-term increase in government bond holdings.

However, Booner (2014), did recognize the fact that whether the regulatory treatment is the main driver of banks' large holdings of the government bonds or this is just the banks' own risk management process is still a matter of further research. To understand the mechanism of commercial banks holding of government bonds and why the commercial banks change the portion of bond holding requires a detailed analysis of individual banks risk tolerance, and whether the change of government bonds is due to the benefit of regulatory rules is a crucial part of the existing literature. However, finding the individual banks risk preferences and whether the commercial banks are holding the bonds due to less requirement of capital is difficult to observe. Because it is possible to see that the banks do increase their sovereign bond holding even during the crisis period and when the banks are in liquidity shortages. That is constructed by the government bonds on the balance sheets of these banks which perform the main transmission channel through which a weak state of government finances may affect the banking system and can constitute a systemic risk.

This systemic risk transmission sometimes referred to as the chain effect between the governments and their respective banking sectors. As per the European central bank, they show that the 10 % of the banks' assets in the euro area accounted for just over currency area, or 2.73 trillion euro on sovereign bonds. It is found that by the end of 2015, the sovereign bond holding by the commercial banks is accounted for 300 billion euros compared to 2014. A similar report by the European Political Strategy Centre find that the major portion of bond holding of the commercial bank is held in terms of the local government bonds. The stress test result by the European Banking Authority in 2014 shows that the share of the sovereign debt held by the domestic banks in the euro area varies among the affiliate countries from more than 10 % in Latvia to over 90 % in Malta. The above result shows the extreme share of bank portfolios in existing stock, the national public debt and its attractiveness to the foreign banks. The average level of bank holding of sovereign bonds is very at level of 57 % and has been increasing since the beginning of the financial crisis.

Another paradigm of studies blames the European Central Bank (ECB) for the sovereign debt crisis and the local banks increased demand for the government bond is due to the free money given by the ECB to the local banks. The ECB released a abundant of trillions of euro to carry out long-term

refinancing operations to the commercial banks and the local banks used this money to buy the government bonds. This operation by the commercial banks is widely known as carry trades. According to Thompson from Financial Times (2013), The carry trade operation is used significantly by commercial banks in different EU countries and from October 2011 until the end of 2013, the Spanish banks increased government bond holdings as a proportion of their total assets from 5 % to 9.4 %, the Italian banks from 6.4 % to 10.3 %, the Portuguese banks from 4.6 % to 7.8 % and the Slovenian banks from 7.8 % to 10 %. In Germany, the banks increased this proportion from 3.8 % to 4.5 %, the French banks and the Austrian banks by 1 %, respectively.

The Thompson report finds that the majority of the sovereign bond holdings contained of the banks' own domestic government bonds. A recent study by Groendahl and Black (2016), argued that the treatment of the sovereign bonds as a risk-free asset worsened the debt crisis in the euro area as the balance sheets of the banks in the countries like Greece, Spain and Portugal were burdened with bonds of their individual sovereign government bonds. However, the Deutsche Bundesbank supported the initiatives of risk weights for government bonds as well as exposure limits, because this measure more likely to reduce the preferential treatment and an extreme demand for the government bonds. One of the drivers of the preferential treatment of the sovereign bonds and the high demand is largely supported by the Basel II accord and the Basel III accord and which is also confirmed by several researcher. Such as Lang and Schröder (2015), who showed that the demand is significantly driven by the government net issue of securities and both the Basel II accord – for example the net impact of credit default probability on risk weights – and the Basel III accord – for instance an enhanced capital and new liquidity requirements – have a robust positive impact on the banks for the domestic marketable sovereign debt. Although, the primary goal of the Basel framework is to improve the capital requirement and to increase the liquidity buffers of the commercial banks, however, the current bank regulation seems to be giving incentives to the commercial banks to buy more government debt to meet the Basel requirements.

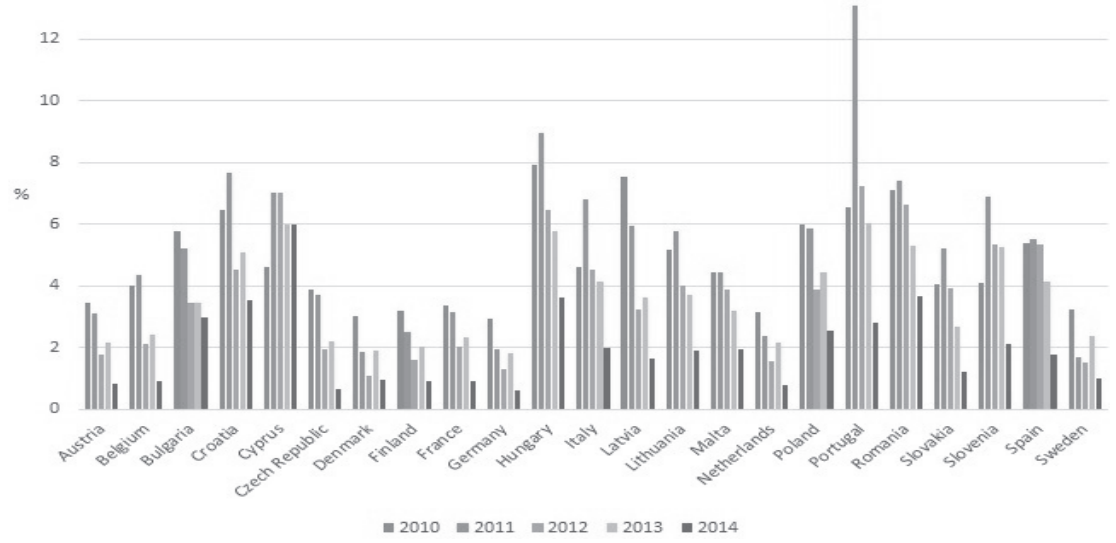
According to T. Asonuma, S. Bakhache and H. Hesse (2015), there are more issues that contributes to the commonly known home bias – such as the demand of the domestic banks for holding the local sovereign debt instruments in compared to the sovereign bonds of other countries. This replicates a preferential regulatory treatment with a zero risk-weighting. However, the risk weights may differ for foreign sovereign debt significantly among different countries and which could contribute to the cross-country differences of the home bias. An increase in the home bias during and after the recent crisis period across many countries benefited from the higher importance of the domestic sovereign debt for a central bank collateral as well as market funding. During the financial crisis we could see that several advanced economies increased their debt supply of sovereign bonds and local banks used to absorb those debt while there was a lack of investment from the foreign banks. The lack of investment from the foreign banks and the local banks preference of their own sovereign bonds could be occurred in an environment of the increased global risk aversion. Another potential reason for the local banks in the Euro area holding a large portion of domestic debt could also be related to their lack of investment opportunities relative to the size of the banking sector. Because in many central or eastern European countries the banking sector is very rigid and highly competitive and hence earning a significant profit margin from the conventional mortgage, or loan services is quite difficult. Based on the European Central Bank data from the first half of 2013, the banks held excessive volumes of bonds in some countries in relation to the Tier 1 capital ratio. It is due to the preferential treatment and a zero weights risk approach – in a case of Germany at level of 214 %, Italy at level of 204 %, Spain at level of 156 %.

2. DATA AND METHODOLOGY

In the analysis, a focus is laid on the bondholding by the commercial banks during the period from 2010 to 2014 in the 23 selected countries of the European Union. The main aim of the research is to analyses an evolution and the changes in holding throughout the financial and debt cri-

sis. In the current research we would like to estimate the effect of sovereign credit rating, which reflects the creditworthiness of the country and the long-term interest rates of the bonds as a yield, in relation to Government bond holdings of the local commercial banks in our selected countries. There are 115 observations of each variable for the 23 countries in the model. As for the credit rating the Standard & Poor's rating in the year is applied. Since these values are expressed not as numerals, we used a linear scale transformation by following the method applied in Sovereign Credit Ratings and Financial Markets Linkages in the article of Alfonso, Furceri and Gomes, 2011. In line with this scale, the best rating AAA is 17 and the poorest rating D is 1. The credit rating of the sovereign bonds reflects the ability of a country to meet its debt liability towards the investors and therefore the credit rating of the government bonds should be an important factor for the investors that can influence their investment decision whether to invest on this asset or not. In our model we have also used the interest rate on ten-year government bond reflecting the yield of this type of asset. The following figure, an evolution of the ten-year government bond interest rates in the period from 2010 to 2014 can be seen.

Figure 1. Interest rates of ten-year government bonds of selected European Union member countries from 2010 to 2014



Source: own processing based on the European Central Bank Statistical Data Warehouse

We can see a steady decline in the interest rates for each our examined country, which might be caused by the fall of the market interest rates in line with the declining European Central Bank key rates. The dependent variable in the model is represented by the government bond holdings of the monetary institutions and the other financial institutions in the selected countries of the European Union in the explored period from 2010 to 2014. The data is provided by the Statistical Data Warehouse of the European Central Bank. A focus is laid only on holdings of domestic government bonds by domestic banks, so that we can analyses the impact of only domestic credit rating and sovereign rates changes during the years of the European debt crisis.

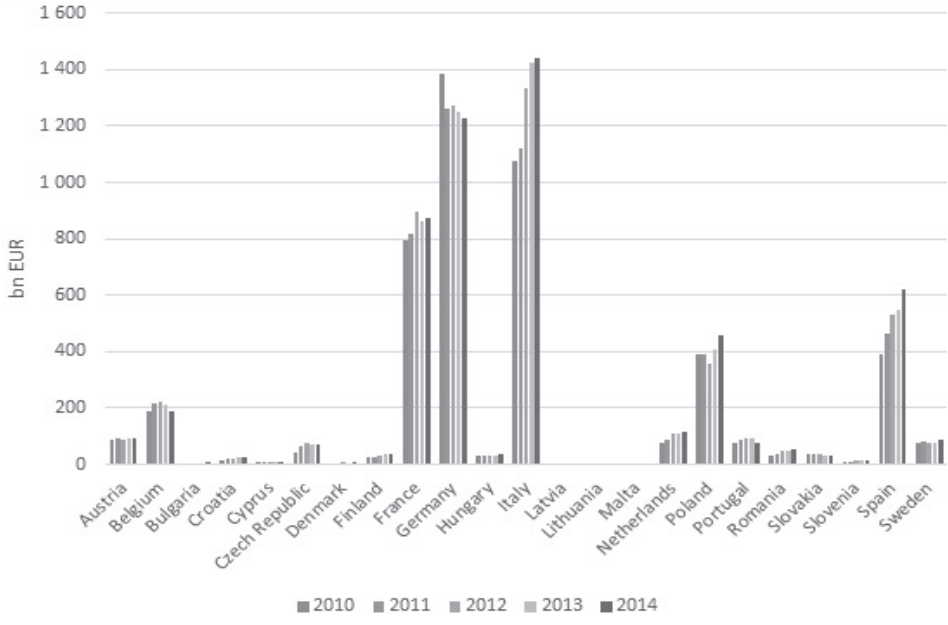
As seen on Figure 2, the volume of sovereign bond holdings had mostly an increasing trend in the selected European Union member countries with only a few exceptions as Belgium, Czech Republic, Germany, and Slovakia. The highest volume of bond holdings by the commercial banks is in France, Germany, Italy, Poland and Spain. France, Italy and Spain increased their holdings even though the sovereign bond ratings of these countries downgraded during this period.

In this analysis, the panel regression with random effects is applied. This approach is used to analyses the panel data, which represent an evolution of the bond holdings, rating and interest rates in this case in 23 countries during the period from 2010 to 2014. The fitness of this model is confirmed by the Durbin-Wu-Hausman specification test. It demonstrates a reject of the null hypothesis that both fixed-effects model and random effect model are consistent, suggesting that the random-effect model would be appropriate in this case. The test statistics is at level of 2.5475 with p-value standing at 0.27978.

3. RESULTS AND DISCUSSION

Based on the data of the independent variables – credit rating and ten-year government bond interest rate – and the dependent variable – the government bond holdings by the commercial banks – in 23 countries during the examined period from 2010 to 2014, the outcome of the regression analysis is demonstrated in Table 1. The elementary model statistics is visible below in Table 2.

Figure 2. Domestic government bondholding by the commercial banks in the selected countries of the European Union from 2010 to 2014



Source: own processing based on the European Central Bank Statistical Data Warehouse

Table 1. The estimated regression coefficients – the random effects model

Indicator	*Estimated coefficient*	*Standard error*	*t-test statistics*	*p-value*	*Statistical significance*
constant value	362975	89055.6	4.076	0.0000 86	***
credit rating	−9823.22	2762.59	−3.556	0.0006	***
interest rate	−5429.43	2680.19	−2.026	0.0452	**

Source: own elaboration by the authors

Table 2: The model statistics

Parameter	*Value*
mean dependence	223893.8
standard deviation dependence	385102.8
residual sum of squares	$1.76 . 10^{13}$
standard error	395003.7
within variance	$1.60 . 10^{9}$
between variance	$1.56 . 10^{11}$
quasi-demeaning theta	0.954728

Source: own elaboration by the authors

Following the regression results, a constant value and the coefficients for both of our explanatory variables (the credit rating variable and the ten-year government bond interest rate variable) are statistically significant, as we can see that both coefficients are negative. In the context of our first independent variable the coefficient suggests that the lower the rating, the higher the government bond holdings, and for the second variable it signifies that the lower the interest rate, the higher the government bond holdings.

The interpretation of these results might be difficult to explain, since the results are contradictory to the logical investment behavior from an investor perspective. A logical investment intention would be to hold more bonds when the ratings of the government is higher, which mean that the higher the rating and rates, the higher the government bond holdings and to buy more assets which yields more interest rates. In our case, it is quite the conflicting condition. We could explain the result in a way that the financial and debt crisis changed the view of the commercial banks investment strategy. logic. In Figure 2 we can see that the commercial banks increased their bond holdings in all the selected countries with only a few exceptions during the examined period although the credit ratings were downgraded, and the interest rates declined to a significant extent.

We could explain the results of our analysis in three different ways. First, there could be a lack of investment opportunities during this period as the financial market were just recovering from the global crisis and the mortgage market might still be stagnant. So, the commercial banks found it difficult to investment in other sectors.

Second, as per the European Union capital regulation in a form of the Capital Requirements Directives IV, which consider the government bonds of the European Union member countries risk-free – this means that the sovereign bonds under these conditions have zero risk weight and thus, the banks, which own them, have zero credit risk exposure towards these assets and they do not need to increase their own capital. Therefore, we argue that the preferential treatment of the government bond holdings might be the issue that caused the local commercial banks to increase their government bond holding. Because the commercial could invest in assets without increasing their capital requirements and additionally, they could also earn a lucrative profit while other investment sectors are rigid to invest.

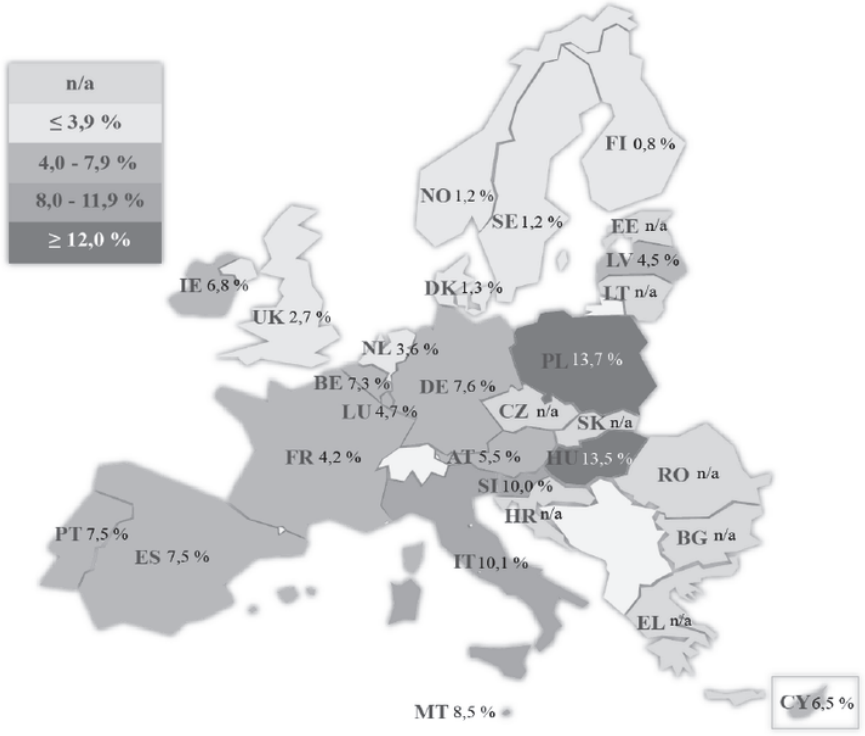
Third, the moral hazard issue might also be the factor that affected the commercial banks to investment more on sovereign bonds. Since, commercial banks are the integral part of the financial system and hence, in the event of default the central bank would help the defaulted bank to avoid any chain effects of bank defaults. Therefore, the commercial banks could invest more on sovereign debts even though the bonds are not highly rated.

In the following map on Figure 3, an average exposure of the commercial banks to the home sovereign debts can be seen, based on the European Banking Authority 2015 Transparency exercise. In a line with the examined regression analysis, the results of the current analysis are consistent with the findings of the authors for instance N. Gennaioli, C. Bonner, T. Asonuma as showed in the litera-

ture of this paper. It is quite stimulating that there was no statistically significant association between the sovereign bond holdings on the one hand and the ratings and the interest rates on the other hand in the period prior to the financial and debt crisis meaning the period from 2005 to 2009.

We presume that the present capital regulation is accountable for an evolution of the bond holdings during the period from 2010 to 2014. Since the holdings increased despite a growing default risk changes in the European capital regulation can be expected and a preferential treatment of the sovereign bonds in a short time to avoid a potential systemic shock in the future. The possible alternatives of handling these problems are discussed in the further sections of the paper.

Figure 3. An average exposure to the home sovereign debt as of 30th June 2015 expressed as a share of the total assets



Source: Magnus and Ciucci, 2016.

4. SUGGESTIONS FOR THE FUTURE

As already stated in the above lines, the commercial banks increased their holdings of the sovereign bonds in the period from 2004 to 2014 despite worsening credit quality of these financial assets. This could bring potential future problems related to a state default, which might be transferred to the banking system via the large holdings of the national bonds in the balance sheets of the commercial banks. The possible alternatives of decreasing over-exposure of the commercial banks towards the national debts are discusses in this section.

The interconnection between the sovereign debt and the banking sectors can be depicted by the following scheme. The regulators are aware of the mentioned potential implications. Already, the two alternatives are currently being discussed how to handle this problem – introducing caps for bond-holding set as a portion of the core Tier I capital or increasing risk weights of this kind assets. A re-

duction in the sovereign bond holdings could weaken the link between the banks and the sovereigns and it could free up the funds for the private sector lending (Icaza and López, 2016).

However, penalizing these holdings would also reduce a banks' ability to stabilize the sovereign bond markets and it could exacerbate a financial fragmentation in the event of a stress in the European Monetary Union. The relationship between the public debt portfolios and the banks' business activities is shaped by the banking regulations in general and the accounting regulations in particular, insofar as this debt, which is traded on the official exchanges, is subject to supply and demand, which may or may not be driven by the interest rates.

Since the financial crisis, the banks across the several European countries have sharply increased their public debt holdings in terms of both the outstanding balances and the balances relative to the total bank assets. In light of this development, the European Commission has proposed own document COM (2015) 587, which accompanied the European Commission proposal to complete the banking union with a creation of a European deposit insurance scheme suggested in COM (2015) 586, whose absence has been flagged in the different areas as an important gap if the aim is to decouple the bank risks from the sovereign risks as much as possible. Among the risk-mitigation measures proposed by the European Commission in the mentioned documents, those affecting a banks' solvency along either of the following two dimensions stand out treatment or weighting of the sovereign exposures and the limits on such exposures.

The European Commission also notes that such initiatives would emerge firstly within the Basel Committee on Banking Supervision, from where they would be transposed into a European legal framework.

The introduction of some form of a haircut on the banks' sovereign debt holdings would have an impact on the entities' allocation of the resources and on a link between the banks and the sovereigns. The limits on the bond holdings would have a substantial impact on the peripheral issuers where a volume of the debt held by the domestic banks rose considerably during the crisis. Meanwhile, an impact of the weighting sovereign bond holdings for capital adequacy purposes would depend on the risk weights assigned. If the weights are in a line with the sovereign credit ratings, an impact on the cost of the capital would exacerbate the scan yields these bonds currently offer so that their risk-adjusted returns dip below those offered by the corporate loans.

A study by A. Lenarcic, D. Mevis and D. Siklos (2016) suggested that both policy options – the positive risk weights and a limit in volumes to invest– would lead the commercial banks with a better bank risk management and that would help the bank to handle the risk more efficiently. They also argue that the risk weight and the positive adjustment of capital ratio would help them to better absorb the losses. Similarly, the higher capital ratio could force the bank to look for other profitable investments rather than the risky sovereign bonds. The positive risk weights would also improve a risk transparency and the correct distorted incentives for investing into the sovereign bonds. On the downside, the both regulatory proposals would lower bank profitability in the short run. However, in the longer run, the inclusion of a risk weights could increase the bank profits as the high costs of sovereign debt might lead to a more diversified portfolio and to the lower funding costs.

Given the strong association between the sovereign and the banking sector, any regulatory change could have a large initial impact. Because, the commercial banks are holding the sovereign bonds for a longer time and they are quite habituated to hold a large portion of their investment in the sovereign debt, which implies that any regulatory changes and to reduce the suitability of government bonds would distort this relationship that may result in a considerable restructuring of the financial market in some countries. Because it is quite common for the euro area banking sectors to hold around 20 % to 30 % of their domestic sovereign outstanding debt. Furthermore, among the banks in the European Banking Authority 2013 Transparency exercise, 60 % of the total sovereign exposure was with the domestic sovereign. Any change to that set of the incentives would cause a structural break that could imply a larger cost to the financial market such as an investment crisis or a lot of idle money with the banks. In the current environment, which is still marked by legacies of

the crisis, those costs could have a destabilizing effect. Hence, a gradual and transparent transition would be crucial for a successful implementation of any regulatory change.

A prominent research by A. Lenarcic, D. Mevis and D. Siklos (2016) state that reforms of the current regulation should follow these goals.

- increasing the banks' flexibility to the sovereign risk by improving the ability to absorb the losses by increasing the capital requirement and by alleviating the home bias through a better diversification of the fixed income portfolios of the banks;
- refining risk transparency, which promotes the correct enticements in the portfolio allocation and consequently restricts the accumulation of risks;
- reducing the systemic risks in the banking sector by preventing fire-sales and spill-overs, preserving bank profitability, decreasing bank leverage and generally severing the sovereign-bank connection;
- avoiding the price distortions on the sovereign bond market;
- maintaining liquidity in the sovereign debt markets;
- avoiding crisis amplification for the vulnerable countries that could occur due to the worse financing conditions or the bank resolution costs – no comparative disadvantage for the European Union sovereign debt issuers;
- Invest more on the real economic activities and that would potentially facilitate the economic recovery.

We also suggest that the implication of non-zero risk weights to the sovereign debt could have a significant positive impact on the risk exposure of the commercial banks. The risk exposures would create a scope for the commercial banks to minimize their cost regarding the holding of the specific sovereign bonds and it could lead to the substitution effects, since all the sovereign bonds would no longer carry the zero-risk weight. Hence, the banks would pursue to reduce their costs of the holding sovereign bonds and this exposure could led them to hold only a specific bond which has better credit rating and there is a less positivity to default. Apart from the investment criteria, the potential political motives of holding the domestic sovereign bond would suddenly contradict with the cost of holding the risky local government bonds. Introducing the proper risk weighting of the sovereign exposures would have hence the potential to weaken a link between the banks and their domestic sovereign.

However, how to put the risk weight on the sovereign bonds is also an important task that lies to the government while issuing the bonds. We suggest that the introduction of the non-zero sovereign risk weights, could be set based on the credit rating agency ratings or the internal calculations following the internal ratings-based approach that would lead to an increase in the risk weighted assets. This would happen both, in the transition period when the regulatory changes are being phased in and in the long run, whenever there would be an increase in the riskiness of any sovereign held in the bank portfolio that would imply an increase in the risk weights. The higher risk weighted assets will lead the banks to either look for more capital or to adjust their portfolios or their balance sheet size. It is necessary to emphasize that the size of the capital adjustment will be larger for the banks with the large exposures to the sovereign bonds with the low ratings. The current paper suggests that most of the banks in the Euro zone need to recalculate their risk tolerance and the capital requirements as we have seen that the home bias caused the commercial banks to hold a significant amount of low rated sovereign bonds in their balance sheet.

A major question can be raised how to comply with the capital requirement or risk tolerance once the risk weights of the sovereign bonds are properly adjusted? We argue that to comply with the Capital Requirements Regulation and risk tolerance, the banks may need to consider at least three rules, the first one is to decide whether the bank have the enough capital buffers, or they can raise the additional capital. The second point is to determine whether they can divest the risky sovereign exposure at a reasonable price while keeping their balance sheet not exposed to excessive risk. And

finally, the banks need to find suitable alternatives to invest apart from the sovereign bonds that would yield their investment positively, but which is not limiting banks liquidity coverage ratio.

We would also suggest that when the banks cannot raise the adequate capital, they may need to adjust on the own asset side by disposing the some of the risky sovereign exposure or by substituting it with the other real economic investment. The extent to which the banks would reduce exposure to the sovereign bonds with an increased risk weight depends significantly on the losses the banks would incur by doing so. If we consider the transition period, if the banks have enough time to adjust in that case, the banks could decide to hold the sovereign bond until they get matured and to limit participation in the primary market. On contrary, the banks can try to sell the relevant sovereign exposures as soon as possible to lessen their losses. The shedding of the sovereign exposures and the price effects would depend crucially on the amount of exposures in the held-to-maturity portfolio, which is valued at the book value, and the price elasticity of the sovereign bond. In the steady state, the sudden increases in the risk weights on the certain sovereign bonds would also have a potential to lead to the selloffs.

Although both the limits on the sovereign exposure and the positive risk weights have the same objective, namely to minimize the feedback loop between the sovereign bonds and the banks and to increase the banks' flexibility to the sovereign risk, they are different in many aspects. Firstly, the sovereign exposure limit is a diversification tool which aims to minimize the banks risk exposure on a single sovereign bond. Secondly, we do not suggest increasing the capital requirement to expose more banks assets with the affected sovereign bonds, rather a divestment could be a suitable option. Lastly, it is less pro-cyclical. At a system level – for instance in the euro area – the banks will be forced to hold a diversified government bond portfolio, but that does not preclude them from absorbing the additional sovereign bonds from the other issuers. However, in a situation of stress, if the domestic banking sector could no longer absorb the additional supply of the government bonds and the banks from the other jurisdictions and the other sectors were unwilling to do so, the exposure limits could result in the cliff effects and it could put a further pressure on the funding conditions of the sovereign that is already under stress. Furthermore, due to an internal capital generation in the upward phase of the cycle and the losses in the downturns of bank equity. Moreover, therefore, the nominal limit changes in a pro-cyclical manner. In the transition, the government debt agencies would be required to build a geographically more diversified investor base, which could prove challenging. This could be particularly difficult for the smaller countries with the less liquid sovereign bond markets.

The further emphasize that the benefits in the terms of an increased sustainability in the banking sector would come at a cost for some sovereigns. We recognize that the sovereign bond holdings would become pricy in the terms of capital if the positive risk weights were applied or the exposures were capped by a hard limit. In the both cases, banks would try to absorb the riskiness by raising additional capital in their balance sheet or by reducing the sovereign bonds from their investment portfolio. An increased supply of the sovereign bonds and a lack of demand for new issues would raise the funding costs for the local government and consequently, for the whole economy. Furthermore, the both policy options would lower liquidity in the sovereign debt markets, as they add to the cost and hamper the ability of the banks to provide the market-making services. This exposure limits can have a significant consequence on the financial markets in the short run, since the commercial banks conventionally have the large exposures to the domestic sovereigns that they would have to dispose. That would increase the tendency of other financial institutions to participate in the sovereign debt market and they need to absorb this additional supply. At the same time the sovereign debt issuers need to find an alternative source of financing, however, that could be challenging as well, if the largest investors (commercial banks) are reluctant to buy their bonds.

Additionally, the two options could exacerbate long-run macro-level cyclical developments for the distressed sovereigns. During an economic downturn, an increased riskiness of a sovereign could translate into the higher risk weights and a higher capital charge for the bank holding its debt. This

would further worsen financing conditions for the sovereigns precisely at the time when fiscal space is mostly needed. Similarly, the exposure limits could lead to the cliff effects in a downturn, if the sovereigns fail to extend their investor base. It is expected that the introducing positive risk weights would have the largest effect on the stressed sovereigns, while the imposing exposure limits would impact the sovereigns with the large outstanding debt volumes at most.

The trade-off between strengthening the resilience of the banking sector to the sovereign risk and maintaining the investor base for the European sovereigns makes an issue of adjusting the regulation particularly complex. Any policy decision needs to consider the effects it would have on the sovereign funding conditions. In addition, as the banks traditionally hold the large amounts of the sovereign debt, any regulatory change could have a large initial impact with potentially destabilizing consequences. Hence, a gradual and transparent transition would be crucial for a successful implementation of any combination of the two alternatives.

CONCLUSIONS AND POLICY IMPLICATIONS

The aim of this current paper was to evaluate the effect of sovereign credit rating and the ten-year bond interest rates on the bond holdings of the commercial banks in the selected 23-member countries of the European Union during the period of 2010 to 2014. We found that there is a statistically significant inverse relationship exists among the selected variables of the paper and the government bond holdings by the commercial banks. Our results suggest that even though the credit rating of the government is lower and the yield on the bonds declined significantly still the commercial banks increased their investment in the local sovereign bonds. As we already explained, the results of this paper are quite difficult to explain in a logical business or investment criteria. However, it is more likely that the phenomenon is caused by a preferential treatment of the government bonds as the risk-free assets supported also by the moral hazard issue and a pledge of bail-out of the defaulted sovereigns, especially in the euro area, and that might lead the commercial banks to expose more on risky domestic sovereign debt.

These conditions call for a reform of the regulation. In the medium term, it may not be beneficial to review the treatment of the bank exposures to the sovereign debt – for example by setting the large exposure limits. Among the largest euro area countries, Italy and Spain would be likely to bear the biggest impact on their bond markets, as the banks hold significant amounts of their sovereign debt in those countries. A debate is still ongoing within the European Central Bank on whether a quantitative cap should be an ideal mechanism to limit the asset risk. There is a proposal of a 25 % equity cap, which would force the euro area banks to sell bonds worth 1.1 trillion euro. The banks can now easily offload some of their excessive bonds onto the European Central Bank and in turn its bond-buying stimulus programme can be helpful to increase the financial stability of the euro area. Another possibility to avoid such a concentration of risk would be to structure the bonds with the capital reserves, which would at least make it possible to tolerably contain risk over the medium term.

The banks' ability to stabilize the sovereign debt market because of the introduction of the risk weight limits could potentially generate episodes of the sovereign stress that need not necessarily derive from deterioration of the country's fundamentals. This effect would be particularly significant if the weight assigned to the sovereign bonds for the calculating capital ratios depends on the bonds' credit ratings, as this would make these holdings particularly onerous in the terms of risk-weighted assets during the period of economic weakness – in terms of a pro-cyclical effect.

The government bond exposure limit is a tool for the commercial banks for portfolio diversification which aims to decrease risk in the balance sheets by restraining exposure to a single sovereign, but it ignores credit risk as itself. An introduction of the positive risk weights to the sovereign exposures would create a scope for a cost optimisation about hold the specific sovereigns and could lead to the substitution effects, since all the sovereigns would no longer carry a zero-risk

weight. Therefore, the banks might seek to reduce their costs of holding the sovereign exposures. The higher risk-weighted asset might affect the banks to either increase their capital requirement or to adjust their portfolios and their balance sheet size. We would also like to emphasize the pro-cyclicality of the risk weights – for instance since a risk parameter vary with the cycle, the risk weights would move pro-cyclically. As a result, the risk valuations may be extremely lenient when the economy is in an upturn, whereas during broad-based price declines, views on risk may be too pessimistic. In the up-cycle, too little capital is held, while the banks may desperately seek more capital in a downturn.

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